CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

LOMA LINDA CONNECTED COMMUNITY CITY WIDE FIBER OPTIC BACKBONE

PROPOSAL

The undersigned bidder hereby proposes to furnish all labor, materials, equipment, tools and services necessary to perform all work required under the Bidding Schedule of the City's Specifications entitled:

LOMA LINDA CONNECTED COMMUNITY CITY WIDE FIBER OPTIC BACKBONE

in accordance with the intent of said Specifications, Drawings, and all addenda issued by said City prior to opening of the proposals.

Said bidder agrees that, within ten (10) calendar days after receipt of the contract from said City, he will execute said contract in the required form, of which the Notice Inviting Bids, Instructions to Bidders, Proposal, Certification of Non-Discrimination By Contractors, Non-collusion Affidavit, Specifications, Drawings, and all addenda issued by said City prior to the opening of proposals, are a part, and will secure the required insurance and bonds and furnish the required insurance certificates; and that upon failure to do so within said time, then the proposal guaranty furnished by said bidder shall be forfeited to said City for such failure; provided that if said bidder shall execute the contract, secure the required insurance and bonds, and furnish the required insurance certificates within said time, his check, if furnished, shall be returned to him within 20 days thereafter, and the bid bond, if furnished, shall become void.

Said bidder further agrees that all the work included in the proposal shall be completed in **70** working days from the date specified in the Notice To Proceed and to accept in full payment therefore the price(s) named in the Bidding Schedule(s). Said bidder further agrees to pay to the City of Loma Linda the sum of **$600.00** per day for liquidated damages in accordance with Section 8.06 of the General Conditions.

Licensed in accordance with an act providing for the registration of contractors, License No. 618983 ; Class C10, B, C7.

*CONTRACTOR **John Griffin Construction, Inc.**

BY: **John F. Griffin**

TITLE: **President**

BUSINESS ADDRESS: **244 Jason Court; Corona, Ca 92879**

*If an individual, so state. If a firm or Co-partnership, state the firm name, and give the names and addresses of all individuals, Co-partners, composing the firm. If a corporation, state the legal name of the corporation, also names of President, Secretary, Manager, and Treasurer thereof, with their business addresses:

Corporation chartered under the laws of the State of: **California** **1989**

No other officers

ADDENDA ACKNOWLEDGMENT

The undersigned acknowledges receipt of the following ADDENDA and the cost, if any, of such revisions has been included in the TOTAL BID of the Bidding Schedule(s).

ADDENDUM NO. The City of Loma Linda *Connected Community Program,* Design, Installation and Product Specifications DATED: 6/16/04

ADDENDUM NO. _____ DATED: _____

ADDENDUM NO. _____ DATED: _____

ADDENDUM NO. _____ DATED: _____

Name of Bidder John Griffin Const; Inc.

Address 244 Jason Court; Corona, Ca

State License No. 618983

Telephone No. (951) 278-2377

By: _____
Signature

Title President

Dated this 8th day of September, 2004

GENERAL INFORMATION REQUIRED OF BIDDER

The bidder shall furnish the following information. Additional sheets may be attached if necessary:

1. Address: 244 Jason Court,Corona, Ca. 92879

2. Type of Firm: Utility Contractor Individual: _____

   (Check One) _____ Partnership
   ____X___ Corporation

3. Telephone Number: (951) 278-2377

4. Contractor's License: State: California License No. 618983

5. Names and titles of all members of the firm:

   John F. Griffin

6. Number of years as a Contractor in construction work of this type: 21 Years

7. Three projects of this type recently completed:

Contract Amt.	Type of Project	Date Completed	Owner's Name, Address (Contact Name) & Phone #
2.3 Mil.	Fiber Dist.	7/30/04	Adelphia Cable Shawn Boykin (714) 920-6309
2.6 Mil.	Fiber Dist.	5/24/02	Adelphia Cable Shawn Boykin (714) 920-6309
5.8 Mil.	Fiber Dist.	10/30/03	Adelphia Cable Bert Bramley (714) 920-6152

8. Person who inspected site of the proposed work for your firm:

   Name: Mike Houska / Rod Caldwell Date of Inspection: August 2004

9. **Note:** If requested by the City, the Bidder shall furnish a notarized financial statement, references and other information, sufficiently comprehensive to permit an appraisal of his current financial condition.

9. **Note:** If requested by the City, the Bidder shall furnish a notarized financial statement, references and other information, sufficiently comprehensive to permit an appraisal of his current financial condition.

BID DEPOSITORIES

The bidder shall answer the following questions and shall attach any additional information required.

(1) Were bid depository or registry services used in obtaining Subcontractor bid figures in order to compute your bid?

YES_____ NO X

(2) If the answer to (1) is YES please forward a copy of the rules of each bid depository you used with this bid questionnaire.

(3) Did you have any source of Subcontractor's bids other than bid depositories?

YES_____ NO X

(4) Has any person or firm threatened you with Subcontractor boycotts, union boycotts, or other sanctions to attempt to convince you to use the services or abide by the rules of one or more bid depositories?

YES_____ NO X

(5) If the answer to (4) is YES please provide the following details:

(a) Date _____

(b) Name of person or group _____

(c) Job involved (if applicable) _____

(d) Nature of threats _____

(e) Additional comments (use additional sheets if necessary)

LIST OF SUBCONTRACTORS

The Bidder shall list the name and address of each subcontractor who will perform work on labor or render service or fabricate and install a portion of the work in an amount in excess of one-half of one percent of the prime contractor's total bid or, in the case of construction of streets or highways, including bridges in excess of one-half of one percent of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater.

Name and Address of Subcontractor	Description of portion of work
Bass Communications, 17300 17th ST; Ste J Tustin, Ca 92780	Fusion Splicing
Medina Construction 2537 Rubidoux Blvd Riverside, CA 92509	Final Paving, Cap Asphalt

CERTIFICATION OF NON-DISCRIMINATION BY CONTRACTORS

As suppliers of goods or services to the City of Loma Linda, the firm listed below certifies that it does not discriminate in its employment with regard to race, color, religion, sex or national origin; that it is in compliance with all federal, state and local directives and executives orders regarding non-discrimination in employment; and that it agrees to demonstrate positively and aggressively the principle of equal opportunity in employment.

We agree specifically:

1. To establish or observe employment policies which affirmatively promote opportunities for minority persons at all job levels.

2. To communicate this policy to all persons concerned, including all company employees, outside recruiting services, especially those serving minority communities, and to the minority communities at large.

3. To take affirmative steps to hire minority employees within the company.

FIRM: John Griffin Construction, Inc.

TITLE OF PERSON SIGNING: President

SIGNATURE: 

DATE: September 8, 2004

Please include any additional information available regarding equal opportunity employment programs now in effect within your company.

A NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER

State of California)
)ss.
County of Riverside)

, being first duly sworn, deposes and says that he or she

is John F. Griffin of John Griffin Const; Inc. the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding, that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereof, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Date: September 8, 2004

John Griffin Construction, Inc.
(Contractor)

By: _____
(Signature)

President
(Title)

STATE OF CALIFORNIA CONTRACTOR'S CERTIFICATION

Pursuant to the Business and Professions Code, Section 7028.7 relating to the City's obligation to verify a Contractor's license prior to awarding a contract, the bidder is hereby requested to attach a legible copy of his/her State Contractor's License in the space provided.

ATTACH COPY OF ALL APPLICABLE STATE CONTRACTOR'S LICENSES HERE

State Of California
CONTRACTORS STATE LICENSE BOARD
ACTIVE LICENSE

Consumer Affairs

License Number 618983 Entity CORP

Business Name JOHN GRIFFIN CONSTRUCTION INC

Classification(s) C10 B C-7

Expiration Date 05/31/2005

CSLB

CALIFORNIA CONTRACTOR

LICENSE NUMBER 618983

BOND NUMBER 689133

GRIFFIN JOHN CONSTRUCTION INC

BOND EXPIRATION DATE 05/31/2006

REQUIRED CONTRACTOR QUALIFICATIONS:

The bidding contractor must posses and show proof, of the following qualifications to be considered for this project:

The Contractor must:

- Have been established in business for a minimum of three years
- Have been an authorized distributor of the products they propose for at least three years
- Have in their employ certified technicians trained by the manufacturer of the proposed products to include:
    - Hands-On Installation Course for Placing, Splicing and Testing of Fiber-to-the-Business (FTTx) Deployments
    - Installation Course for MCS Road Cable
    - Installation and Technology Course for Free-Space Optics
    - Hands-On Installation Course for Maintenance, Restoration, and Troubleshooting of Single-Mode Plant Facilities
- Must provide a labor and craftsmanship Warranty.
- Possess all necessary business state and local licenses for providing services in Loma Linda, Califomia
- Are licensed "B" General, "C-10" Electrical, and "C-7" Low Voltage
- Demonstrate on-going maintenance experience in residential areas; experience and capabilities to utilize ground penetrating radar; and experience with Alpha Technologies power equipment and housing apparatus
- Have reference accounts of similar size and complexity for last 5 years
- Have D&B Number; insurance modification rating, state excavation permit, and trained competent employees
- Are capable of (2) two hour emergency response
- Operate a competent technical assistance center available 7/24
- Have a minimum of $3,000,000 in liability insurance
- Are bondable for performance of this job
- Provide overall general project management
- Provide single point of contact for the project duration
- Manage all project subcontractor services

***Attach additional sheets giving the information.**

STATEMENT OF CONTRACTOR QUALIFICATIONS

Contractors meeting the above listed qualifications will also be required to fill out the following Statement of Contractor's Qualifications specimen form. The form needs to be filled out at the time the quote is submitted. Contractors are required by the City to prepare and submit the data requested in this form before the award of the Contract.

1. Name of bidder. John Griffin Construction, Inc.

2. Business address. 244 Jason Court, Corona, Ca

3. When organized. 1983

4. Where incorporated. California in 1989

5. How many years have you been engaged in the contracting business under the present firm name? 21 Years

6. Contracts on hand (Schedule those) Gross amount (each contract).

*7. General character of work performed by our company. Utility Contractor

8. Have you ever failed to complete any work awarded to you? If so, where and why? No

*9. Have you ever defaulted on a contract? If so, where and why? No

*10. List of more important pipelines constructed by your company, including approximate cost. See Attached

*11. List your major equipment. See Attached

*12. Experience in work similar in importance to this project. See Attached

*13. Background and experience of the principal member of your personnel, including the officers.

*14. Credit available. Furnish written evidence.

Financial statement. See Attached

*Attach additional sheets giving the information.

AGREEMENT

THIS AGREEMENT, made and entered into this ___ day of, _____ 2004 by and between THE CITY OF LOMA LINDA, A MUNICIPAL CORPORATION, hereinafter called City, and John Griffin, hereinafter called CONTRACTOR.

WITNESSETH, that the parties hereto do mutually agree as follows:

ARTICLE I: For and in consideration of the payments and agreements hereinafter mentioned to be made and performed by said City, said Contractor agrees with said City to perform and complete in a workmanlike manner all work required under the Project Specifications entitled:

LOMA LINDA CONNECTED COMMUNITY CITY WIDE FIBER OPTIC BACKBONE

In accordance with the Specifications and Drawings therefore, to furnish at his own expense all labor, materials, equipment, tools, and services necessary therefore, except such materials, equipment, and services as may be stipulated in said Specifications to be furnished by said City, and to do everything required by this Agreement and the said Specifications and Drawings.

ARTICLE II: For furnishing all said labor, materials, equipment, tools, and services, furnishing and removing all plant, temporary structures, tools, and equipment, and doing everything required by this Agreement and the said Specifications and Drawings; also for all loss and damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen difficulties which may arise during the prosecution of the work until its acceptance by said City, and for all risks of every description connected with the work; also for all expenses resulting from the suspension or discontinuance of work, except as in the said Specifications are expressly stipulated to be borne by said City; and for completing the work in accordance with the requirements of said Specifications and Drawings, said City will pay and said Contractor shall receive, in full compensation therefore, the price(s) named in the Bidding Schedule.

ARTICLE III: The City hereby employs said Contractor to perform the work according to the terms of this Agreement for the above mentioned price(s), and agrees to pay the same at the time, in the manner, and upon the conditions stipulated in the said Specifications; and the said parties for themselves, their heirs, executors, administrators, successors, and assigns, do hereby agree to the full performance of the covenants herein contained.

ARTICLE IV: The Notice Inviting Bids, Instructions to Bidders, proposal, Certificate of Non Discrimination by Contractors, Non-collusion Affidavits, Specifications, Drawings, and all addenda issued by the City with respect to the foregoing prior to the opening of bids, are hereby incorporated in and made part of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this contract to be executed the day and year first above written.

THE CITY OF LOMA LINDA, CALIFORNIA
(CITY)

BY: _____

ATTEST:

BY: _____ SEAL
City Clerk

_____
Contractor

BY: _____
(Signature)

_____
(Title)

ATTEST:

BY: _____
(Signature)

_____
(Title)

FAITHFUL PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

THAT _____ as Contractor,

and _____ as Surety,

are held and firmly bound unto the CITY OF LOMA LINDA, A MUNICIPAL CORPORATION, hereinafter called City, in the sum of _____ dollars, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said City to perform all work required under the Project Specifications titled:

LOMA LINDA CONNECTED COMMUNITY CITY WIDE FIBER OPTIC BACKBONE

NOW THEREFORE, if said Contractor shall perform all the requirements of said contract required to be performed on his part, at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

PROVIDED, that any alterations in the work to be done or the materials to be furnished, which may be made pursuant to the terms of said contract, shall not in any way release said Contractor or said Surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either said Contractor or said surety, and notice of such alterations or extensions of the contract is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____, 2002.

(SEAL)	_____ (SEAL)
(Contractor)	(Surety)
By: _____	By: _____
(Signature)	(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS,

THAT _____ as Contractor, and _____ _____ as Surety, are held firmly bound unto THE CITY OF LOMA LINDA, a MUNICIPAL CORPORATION, hereinafter called City, in the sum of _____ _____ dollars, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said City to perform all work required under the Project Specifications titled:

LOMA LINDA CONNECTED COMMUNITY CITY WIDE FIBER OPTIC BACKBONE

NOW THEREFORE, if said Contractor, or Subcontractor, fails to pay for any materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, or for amounts due under applicable State law for any work or labor thereon, said Surety will pay for the same in an amount not exceeding the sum specified above, and, in the event suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. Surety shall indemnify the City of Loma Linda against non-payment to subcontractors resulting in litigation. This bond shall insure to the benefit of any persons, companies, or corporations entitle to file claims under applicable State law.

PROVIDED, that any alterations in the work to be done or the materials to be furnished, which may be made pursuant to the terms of said Contract, shall not in any way release either said Contractor or said Surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either said Contractor or said Surety, and notice of such alterations or extensions of the contract is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____, 2002.

(SEAL)	_____ (SEAL)
(Contractor)	(Surety)
By: _____	By: _____
(Signature)	(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

WORKER'S COMPENSATION INSURANCE CERTIFICATE

The Contractor shall execute the following as required by the California Labor Code, Sections 1860 and 1861:

I am aware of the provisions of Section 3700 of the Labor Code, which require every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of the code, and I will comply with such provisions before commencing the performance of the work of this contract.

Date: September 08, 2004

John Griffin Construction, Inc.
Contractor

By: _____
Signature

President
Title

Attest:

By: Bill Friermood
Signature

Bill Friermood
Title

GENERAL CONDITIONS

SECTION 1 - SPECIFICATIONS AND DEFINITIONS

1.01 Referenced Specifications

A. Standard Specifications - The Standard Specifications for Public Works Construction (Green Book) of the American Public Works Association, and Associated General Contractors of California, latest Edition, and all subsequent amendments, supplements and additions.

B. City Standards - The City of Loma Linda's Standard Construction Drawings and all subsequent amendments and additions, available from the City of Loma Linda Public Works Departments.

1.02 Intent

It is the intent of these specifications, and any contract drawings, that the work performed under the contract shall result in a complete operating system in satisfactory working condition in respect to the functional purpose of the installations. The specifications and contract drawings are intended to be complementary of each other. Any work shown on the contract drawings and not in the specifications, or vice-versa, is to be executed as if indicated in both.

The Standard Specifications and City Standards are part of the Contract Documents controlling the work.

If there is a conflict between Contract Documents, the document highest in precedence shall control.
The precedence stated in Section 2-5.2 of the Standard Specifications shall be amended as shown below:

The precedence shall be:

1) Special Provisions
2) General Conditions
3) Permit Requirements
4) Technical Specifications
5) Plans
6) Standard Plans
7) Standard Specifications
8) Reference Specifications

1.03 Definitions

Agency: Where the word agency appears in the Standard Specifications, it shall mean the City of Loma Linda.

Board: Where the word board appears in the Standard Specifications it shall mean the City of Loma Linda.

City: City of Loma Linda, San Bemardino County, Califomia.

Council: The City Council of the City of Loma Linda.

Days: Where the word day appears in the Specifications it shall mean consecutive calendar days unless otherwise noted.

Deputy Director or Director: Same as Engineer

District or Department: Same as Board.

Engineer: The City of Loma Linda Director of Public Works acting personally or through agents or assistants duly authorized by him.

Inspector: The City of Loma Linda Director of Public Works personnel authorized to act as agents for the City in the supervision of work covered by these plans and specifications.

State: Same as City.

Working Day: Any day except Saturdays, Sundays, or legal holidays on which the Contractor is specifically required by Special Provisions, by his labor contract or by law to suspend construction operations. Also excepted is any day on which the Contractor is prevented by inclement weather, or conditions there from, from proceeding with at least 75% of the normal labor and equipment force for at least five (5) hours toward completion of the current controlling operation.

SECTION 2 - AWARD AND EXECUTION OF CONTRACT

2.01 Award of Contract

After the Proposals have been opened and read, they will be checked for accuracy and compliance with the General Conditions. If the unit price and the total amount named for any item do not agree, the unit price will be considered as representing the bidder's intention. The City reserves the right to reject any or all proposals; to waive any irregularity in a bid; and to award the contract to the lowest responsible bidder qualified to do the work as specified. Award of the Contract, if it were made, will be made by the City Council.

2.02 Execution of Contract

A contract agreement shall be executed by the successful bidder on the forms provided and returned, together with the contract bonds and certification of insurance within ten (10) days after the receipt of said contract from the office of the City Clerk. After execution by the City, one copy will be returned to the Contractor. If the bidder to whom the award is made fails or refuses to enter into the Contract within the time provided, the proposal guaranty shall be forfeited for failure to enter into the Contract. The Council may then award the Contract to the next lowest responsible bidder.

2.03 Contract Bonds

The successful bidder, simultaneously with the execution of the Contract, shall furnish a Labor and Material Bond in an amount not less than one hundred percent (100%) of the contract price and a Faithful Performance Bond in an amount not less than one hundred percent (100%) of the Contract price. Said bonds shall be secured from a surety company satisfactory to the City and the premiums thereon shall be paid by the Contractor. After completion and acceptance of the work by the City Council, the bonds shall be in full force and effect for a time thereafter of sixty days.

2.04 Insurance

The Contractor shall furnish the City with satisfactory proof of carrying the insurance required by submitting a certificate of policies of insurance to the Engineer-of-Work prior to the commencement of the work under this contract. All insurance companies affording coverage to the Contractor shall be insurance organizations authorized by the Insurance Commissioner of the State Department of Insurance to transact business of insurance in the State of California. The policies shall be endorsed precisely as follows:

It is hereby understood and agreed that the Policy to which this certificate refers may not be canceled, materially changed, nor the amount of coverage thereof reduced nor the policy allowed to lapse until 30 days after the receipt by the City Clerk of the City of Loma Linda, 25541 Barton Road, Loma Linda, California, 92354, of a registered written notice of such cancellation or reduction in coverage. Solely as respects work done by and on behalf of the named insured for the City, it is agreed that the City of Loma Linda, the Loma Linda City Engineer-of-Work and their officers, agents,

employees and volunteers are added as additional insureds under this policy and the coverage provided hereunder shall be primary insurance available to the City of Loma Linda, California, and under any other third party liability policy. It is further agreed that the other insurance conditions of the policy are amended to conform therewith.

The Contractor shall take out and maintain, during the life of the contract the following public liability and property damage insurance which shall protect the Contractor or any Subcontractor performing work covered by the contract, and also the City, from claims for personal injury, including accidental death, as well as from claims for personal damages which may arise from the operations under the contract, whether such operations shall be performed by the Contractor or any Subcontractor, or by anyone directly employed by any of them. The Contractor shall defend, indemnify, and hold harmless the City of Loma Linda, its officers, agents and employees or anyone directly employed by them, from all claims arising out of the work. The limit of liability for such insurance shall be stated below.

The Contractor shall not commence work under this contract, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until the City has received and approved the required certificates for the following policies:

(a) Worker's Compensation Insurance to cover employees as required by the Labor Code of the State of California. The Contractor shall require all Subcontractors to provide such compensation insurance for all of the latter employees. Worker's Compensation Insurance certificates shall be submitted by Contractor and all Subcontractors. The City of Loma Linda shall be named as certificate holder.

(b) The Contractor shall maintain public liability and property damage insurance against damage claims which may arise from operations whether by the insured or by anyone directly or indirectly employed by him. Minimum liability and property damage insurance shall not be less than $2,000,000 for all damages arising out of bodily injuries to or death of one or more persons in any one occurrence, and not less than $250,000 for all damages and/or destruction of property in any one occurrence, and not less than $500,000 for all damages and/or destruction of property during the policy period.

(c) Motor vehicle public liability and property damage insurance to cover each automobile, truck, and other vehicle used in the performance of the Contract to protect against liability for damages on account of bodily injury including death resulting there from, in an amount of not less than two hundred thousand dollars ($200,000) for one person, and five hundred thousand dollars ($500,000) for more than one person; and property damages in the sum of two hundred fifty thousand dollars ($250,000) resulting from any one accident which may arise from the operations of the Contractor in performing the work provided for herein.

2.05 Return of Proposal

When the award of the Contract has been made, the Proposal guaranties accompanying such proposals that are no longer to be considered in making the award, will be returned. The remaining guaranties will be returned when the Contract has been fully executed.

SECTION 3 - SCOPE OF CONTRACT

3.01 Clarification of Contract Documents

Should it appear that the work to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the contract drawings or in the specifications, or in the event of any doubt or question arising respecting the true meaning of the specifications, the Contractor shall apply to the Engineer for such further explanation as may be necessary and the Engineer's decision shall be final and binding.

3.02 Effect of Extension of Time

It shall be agreed that in case the work called under the contract is not finished and completed in all parts and requirements within the time specified, the City Council shall have the right to extend the time for completion or not, as may seem best to serve the interest of the City; and if it decides to extend the time limit for the completion of the contract, it shall further have the right to charge to the Contractor, his heirs, assigns, or sureties and to deduct from the final payment for the work, all or any part, as it may deem proper of the actual cost of engineering, inspection, superintendence, and expenses, which are directly chargeable to the contract, and which accrue during the period of such extension except that the cost of final surveys and preparation of final estimate shall not be included in such charges.

3.03 Assignment

The performance of the Contract may not be assigned or subcontracted except upon written consent of the City. No such assignment shall be permitted which would relieve the original Contractor or his surety of responsibility under the contract.

3.04 Recognition of Subcontractor

No subcontractor will be recognized as such, and all persons engaged in the work under this Contract will be considered as employees of the Contractor.

3.05 Liability of City Employees

The City, the Engineer, and City officers and employees shall not be responsible for any liability arising under this Contract.

3.06 Contractor Not an Agent

The right of the City to generally supervise and review the work shall not make the Contractor an agent of the City.

3.07 Guarantee

Besides guarantees required elsewhere in these Contract Documents, if any, the Contractor shall and hereby does guarantee all work for a period of five (5) year after the date of acceptance of the work by the City and shall repair and replace any and all such work, together with any other work which may be displaced in doing so, that may prove defective in workmanship and/or materials within the five (5) year period from the date of acceptance, without expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted. Contractor will not be held liable for any third party damages or loss in revenues due to system failures. Contractor's warranty will be in effect during the period of contractor's sole source agreement. In the event of failure to comply with the above mentioned conditions within seven (7) days after being notified in writing, or in the event of an emergency, the City is hereby authorized to proceed to have the defects repaired and made good at the expense of the Contractor, who hereby agrees to pay the cost and charges therefore immediately on demand.

SECTION 4 - CONTROL OF THE WORK

4.01 Authority of the Engineer

The Engineer shall have general supervision and direction of the work and may be represented on the work by a duly authorized resident engineer or inspector. All claims of the Contractor and questions which may arise as to quality or acceptability of materials furnished and work performed and as to the manner of performance and the rate of progress of the work; all questions as to the interpretation of the Contract, contract drawings and specifications; all questions as to the acceptable fulfillment of the Contract on the part of the contractor and all questions as to compensation shall be referred to the Engineer-of-Work for decision.

4.02 Work to be One

The work to be done consists of furnishing all labor, materials, methods or processes, implements, tools, and machinery necessary for and appurtenant to the construction and completion of the work in accordance with the Contract, and to leaving the construction site in a neat, clean, and orderly condition upon completion of the work.

4.03 Extra Work

Extra work is defined as additional work required by changes in the details of work shown on the Plans and described in the Specifications and for which there is no lump sum or unit price item in the Contract. Compensation for extra work shall be as specified in Section 8.04 - Change Order of these General Conditions.

The City reserves the right to require the performance of extra work when, in the opinion of the Engineer, it is necessary or desirable for the proper completion of the Contract.

4.04 Construction Schedule

Within ten (10) days from the time the Contract is executed by all parties and at such other times as may be requested by the Engineer, the Contractor shall submit to the Engineer practicable schedules which shall show the order in which the Contractor proposes to perform the work, the dates at which the Contractor will start the several parts of the work, and the estimated dates of completion of the several parts.

The construction schedule and supplementary construction schedules submitted shall be consistent in all respects with the requirements of the Contract.

4.05 Documentation of Field Activities

The Contractor working in the field shall keep a daily log of all project activities. The person preparing the log shall sign each page of the logbooks or daily activity logs. Recommended items to be included in the daily log, as appropriate, are:

Project Identification	Visitors to the Site
Field Activity Subject	Subcontractor progress or problems
General Work Activity	Communication with the client or others
Unusual events	Weather conditions
Changes to Plans and/or Specifications	Personnel on Site

4.06 Drawings and Specifications on the Work

The Contractor shall keep one copy of all Drawings and Specifications for the work on the work site in good order, accessible to the Engineer and his representatives.

4.07 Removal of Obstructions

The Contractor shall remove and dispose of all structures, debris, or other obstructions to the construction of the work as specified. Where such obstructions consist of improvements not required by law to be removed by the owner thereof, all such improvements shall be removed, maintained and permanently replaced by the Contractor at his expense as required for performance of the work.

4.08 Interpretation of Plans and Specifications

Should it appear that the work to be done or any matter relative thereto is not sufficiently detailed or explained by the Specifications, the Contractor shall apply to the Engineer for such further explanation as may be necessary and shall conform to such explanation or interpretation as part of the Contract so far as may be consistent with the intent of the original Plans and Specifications. In

the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

4.09 Supervision by Contractor

The Contractor shall give efficient supervision to the work, using his best skill and attention and shall provide and keep on the work at all times during its progress a competent superintendent and any necessary assistants, all of whom, within reason, shall be satisfactory to the Engineer. All directions of the Engineer shall be given in writing and shall be received and obeyed buy the superintendent in charge of the particular work, reference to which orders are given; and all such directions given to the superintendent shall be as binding as if given to the Contractor in person.

4.10 Surveying and Reference Points

The City shall establish all reference points and survey all lines and grades necessary for the execution of the work. The Contractor shall carefully preserve all reference points, benchmarks, and other survey points, and in case of willful or careless destruction, he shall be liable for and charged with the cost of their replacement, and of any expense resulting from their unnecessary loss or disturbance. Such surveys shall constitute instructions from the City, and the Contractor shall not proceed with the work until he has made timely demands upon the City for such surveys, and until all necessary points, lines and grades have been established. Request for survey work shall be made not less than 48 hours in advance of desired time for staking.

4.11 Inspection

The Engineer shall, at all times, have access to the work and shall be furnished with every reasonable facility for acquiring full knowledge respecting the progress, workmanship, and character of materials used and employed in the work.

Whenever the Contractor varies the period during which work is carried on each day, he shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer will be subject to rejection.

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill the Contract as prescribed. Defective work shall be made good, and unsuitable materials may be rejected notwithstanding the fact that such defective work and unsuitable materials have been previously overlooked by the Engineer and accepted.

4.12 Errors or Discrepancies Noted by the Contractor

If the Contractor, either commencing work or in the course of the work, finds any discrepancy between the Specifications and the Plans, or between either the Plans or Specifications and the physical conditions at the site of the work, or finds any error or omission in any of the Plans or Specifications, or in any survey, he shall promptly notify the Engineer in writing of any such discrepancy, error or omission. If the Contractor observes that any Plans or Specifications are at

variance with any applicable law, ordinance, regulation, order or decree, he shall promptly notify the Engineer-of-Work in writing of such conflict.

The Engineer-of-Work on receipt of any such notice shall promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work done by the Contractor, either directly or indirectly, after his discovery of such error, discrepancy, or conflict, will be at his own risk, and he shall bear all costs arising there from.

4.13 Defective and Unauthorized Work

All work, which is defective in its construction or deficient in any of the requirements of the Plans and Specifications, shall be remedied or removed and replaced by the Contractor in an acceptable manner at his own expense. No compensation will be allowed for any work done beyond the lines and grades shown on the Plans or established by the Engineer-of-Work. Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer, made under the provisions of this article, the Engineer-of-Work and City may cause the defective work to be remedied or removed and replaced at the expense of the Contractor.

4.14 Equipment

The Contractor must furnish adequate equipment to properly perform the work in a workmanlike manner in accordance with these Specifications. Such equipment must be in a good state of repair and maintained in such state during the progress of the work. No worn or obsolete equipment shall be used, and in no case shall the maker's rating of capacity for any equipment be exceeded.

4.15 Dismissal of Unsatisfactory Employees

If any person employed by the Contractor or any Subcontractor shall fail or refuse to carry out the directions of the Engineer, or is in the opinion of the Engineer incompetent, unfaithful, intemperate, or disorderly; or uses threatening or abusive language to any person on the work representing the City; or is otherwise unsatisfactory, he shall be discharged immediately, and shall not again be employed on the work except by written consent of the Engineer.

4.16 Termination of Unsatisfactory Subcontractors

When any portion of the work which has been subcontracted by the Contractor is not being prosecuted in a satisfactory manner, the Subcontractor for such work shall be terminated immediately by the Contractor upon written notice from the Engineer, and shall not again be employed on that type of work in which his performance is unsatisfactory.

4.17 Temporary Suspension of Work

The Engineer shall have the authority to suspend the work, wholly or in part, for such period as he may deem necessary, due to unsuitable weather or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he may deem necessary, due to the failure on the part of the Contractor to carry out orders given or to perform any provisions of the work. The Contractor shall immediately comply with the written order of the Engineer-of-Work to suspend the work wholly or in part, and shall not resume the work until ordered to do so in writing by the Engineer.

In the event a suspension of work is ordered because of failure on the part of the Contractor to carry out orders given or to perform any provisions of the work, such suspension of work shall not relieve the Contractor of his responsibility to complete the work within the time limit set forth herein and shall not be considered cause for extension of the time for completion, and further, such suspension of work shall not entitle the Contractor to any additional compensation.

4.18 Final Clean-Up

Upon completion, and before making application for acceptance of the work, the Contractor shall clean the construction site and all ground occupied by him in connection with the work of all rubbish, excess materials, temporary structures and equipment. All parts of the work area shall be left in a neat and presentable condition.

Care should be taken to prevent spillage on streets over which hauling is done, and any such spillage or debris deposited on streets due to Contractor's operation shall be immediately cleaned up.

4.19 Final Inspection

The Contractor shall notify the Engineer of the completion of the work and the Engineer shall make an inspection of the work. The Engineer-of-Work will not make the final inspection until the work provided for and contemplated by the Contractor has been completed and the final clean up performed. The Contractor may be present at the final inspection. The Contractor will be notified in writing of any defects or deficiencies to be remedied. When notified that corrective work is completed, the Engineer-of-Work will again inspect the work and when he has satisfied himself that all work has been done in accordance with the Plans and Specifications he will recommend to the Council that they formally accept the work.

SECTION 5 - CONTROL OF MATERIALS

5.01 Quality of Materials and Source of Supply

Articles, materials, and equipment to be incorporated into the work under the Contract shall be new and unused and shall conform to the requirements of these Specifications and be approved by the Engineer-of-Work before incorporation into the work; and, where required to conform to Standard Specifications or tests of the City or other authorities incorporated by reference, shall conform to the respective editions, including amendments, specified, or where editions are not specified, shall conform to the editions including amendments in effect on the date of the invitation for bids. Promptly after the approval of the Contract, the Contractor shall notify the Engineer-of-Work of the proposed sources of supply of all materials to be furnished by him.

All materials proposed for use may be inspected or tested at any time during their preparation and use. If, after trial it is found that sources of supply, which have been approved, do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources. After approval, any material which becomes unfit for use due to improper storage, handling or any other reason, shall be rejected.

5.02 Samples and Test

The Contractor shall furnish such samples of all materials as are requested by the Engineer without charge. No material shall be used until it has been approved by the Engineer-of-Work. Samples will be secured and tested whenever necessary to determine the quality of the material.

5.03 Defective Materials

All materials not conforming to the requirements of these Specifications shall be considered as defective and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the work unless otherwise permitted by the Engineer. No rejected materials, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the Engineer. Upon failure of the Contractor to comply with any order of the Engineer made under the provisions of this article, the Engineer-of-Work shall have the authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

5.04 Storage of Materials

All materials for use in the work shall be stored by the Contractor in such a manner as to prevent damage from exposure to the elements, admixture of foreign materials or from any other cause.

5.05 Trade Names and Alternatives

For convenience in designation on the Plans and in the Specifications, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and his catalog information. The use of an altemative article or material will not be permitted. Refer to specification for approved material.

SECTION 6 - PROSECUTION OF THE WORK

6.01 Beginning of Work

After the return of the executed contract, together with the prescribed bonds and certification of insurance, the Contractor may request permission to enter upon the site of the work and to begin operations. Any work performed by the Contractor in advance of the official date shall be at the Contractor's own risk. The counting of working days shall begin as of the date indicated on the Notice to Proceed. When the Contractor has started work on the project, he shall diligently prosecute the work to completion within the time limit provided in the Proposal.

6.02 Time of Completion

Time is the essence of this Contract. The Contractor shall complete all work called for under the Contract within the number of days specified in the Proposal.

6.03 Unavoidable Delays

The Contractor will be granted an extension of time for completion of the work for delays which may result from causes beyond the control and without the fault or negligence of the Contractor including but not limited to acts of God, or of the public enemy, acts of the Government, acts of the City, acts of another Contractor in the performance of a contract with the City, fire, flood, epidemics, or strikes.

Any act or omission or anything required to be done by the City of Loma Linda, its officers, agents or employees, which shall cause the Contractor delay in the completion of the work shall be grounds for extension of time on the part of the Contractor to complete the work but shall give the Contractor no grounds for damages for such delay.

6.04 Extension of Time

The Contractor shall be allowed an extension of time in which to complete the work equal to the sum of all unavoidable delays, as determined above, plus any adjustment of contract time due to contract change orders. During such extension of time, neither compensation for extra engineering and inspection nor liquidated damages shall be charged to the Contractor.

Applications for an extension of time must be made in writing within ten (10) days after the delay has been incurred. The reasons for the delay shall be set forth in the request. The City shall, within fifteen (15) days after receipt of the request, give written notice of the approval or denial of the request.

6.05 Weekend, Holiday, and Night Work

No work shall be done between the hours of 5:00 p.m. and 7:00 a.m., after 3:00 p.m. on Fridays, nor on Saturdays, Sundays, or legal holidays without the permission of the Engineer, except in case of an emergency.

If permission for same is granted and any work is done at night, the Contractor shall provide adequate light for proper prosecution of the work, for the safety of the workmen and the public, and for proper inspection.

6.06 Suggestions to the Contractor

Any plan or method suggested to the Contractor by the Engineer-of-Work or inspector but not specified or required, if adopted or followed in whole or in part, shall be used at the risk and responsibility of the Contractor, and the City and the Engineer-of-Work will assume no responsibility therefore.

6.07 Temporary Facilities and Service

The Contractor shall be responsible for providing and maintaining the necessary storage places, field office, temporary road fences, watchman, etc., at his expense. No water shall be drawn from fire hydrants for construction purposes until the Contractor has obtained a permit from the utility services department. The City will provide the staging area's at the corporate yard.

SECTION 7 - LEGAL RELATIONS AND RESPONSIBILITY

7.01 Compliance with Laws and Regulations

The Contractor shall keep himself fully informed of and shall observe and comply with, and shall cause any and all persons employed by him or under him to observe and comply with, all State, Federal, County and City, laws, ordinances, regulations, orders, and decrees which in any manner affect the conduct of the work. Particular attention is called to the Labor Code of California, Part 7, Chapter I, Article 2, Wages and Article 3, Working Hours. Attention is also directed to the provisions in Section 1777.5 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him.

Prior to beginning any work, the Contractor shall contact Underground Service Alert (USA), (800) 422-4133, and obtain an Inquiry Identification Number. Said number shall be reported to the City prior to the start of work.

All Contractors, Subcontractors and their employees shall strictly conform to the rules and regulations of the Federal Occupational Safety and Health Administration (OSHA) and the State of California Division of Industrial Safety (DIS).

Wherever trenching operations are to be done and are five (5) feet or more in depth, the Contractor shall, prior to the start of construction, obtain a permit from the State of California DIS and present it to the City for verification before a City construction permit will be issued. Wherever shoring,

sheeting, and bracing drawings are required by the Federal OSHA or the State of California DIS a copy of the drawings shall be filed with the City prior to the start of construction.

Failure to comply with either the Federal OSHA or the State of California DIS Rules and Regulations will result in immediate action by the City to gain compliance at the Contractor's expense.

7.02 Non-Discrimination

There shall be no discrimination against any employee who is employed by the Contractor or any of his Subcontractors or by any agent of the foregoing in the work covered by this contract or against any applicant for such employment because of race, religion, color, or national origin. This provision shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship.

7.03 Permits

Unless otherwise specified, the Contractor shall procure all permits and licenses (including Business Tax License), pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work. The Contractor shall comply with all provisions of all permits whether obtained by the City or by the Contractor.

The Contractor shall be required to procure a permit from the Utility Services Department to use City water for construction purposes. Standard charges shall be made for such water.

7.04 Patents

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used in or incorporated in the work and agrees to indemnify and hold harmless the City and its duly authorized representatives, from all suits of law, or actions of every nature for or on account of the use of any patented materials, equipment, devices or processes.

7.05 Sanitary Provisions

The necessary sanitary conveniences for the use of the workers on the project, properly obscured from public observance shall be constructed and maintained by the contractor in such manner and at such points as shall be approved by the Engineer-of-Work and their use shall be strictly enforced.

7.06 Public Convenience

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners. Water or dust palliative shall be applied as necessary for

alleviation or prevention of dust nuisance caused by the Contractor's operations. Convenient access to driveways, houses, and buildings along the line of the work shall be maintained at least each morning and evening, and temporary approaches to crossings or intersecting streets shall be provided and kept in good condition at all times.

7.07 Public Safety

The Contractor shall furnish, erect and maintain such lights, barricades, bridges and other devices as required in Section 7-10, Public Convenience and Safety of the Standard Specifications. Should the Engineer point out the inadequacy of warning devices or should the Engineer approve the location of warning devices, such action shall not relieve the Contractor of responsibility for public safety, nor abrogate his obligation to furnish and pay for these devices. Should it be determined, during hours other than work hours and the Contractor is unavailable, that the warning devices are inadequate, the City may furnish and erect such additional devices as may be necessary and the Contractor shall pay for said additional devices at the rate prescribed by the City.

All construction signs to be used on the job site and on the approaches to the job site shall conform to those standards set forth by the State of California, Business and Transportation Agency, Department of Transportation, Manual of Traffic Controls, latest edition. Barricades shall be effectively reflectorized by having not less than one-half of the top board of the barricade covered with reflectorized sheeting surface or two 3-inch diameter reflector units. All other types of delineators shall have reflectorized sheeting, other reflective surfacing, or 3-inch reflector units. All warning flashers shall be kept in good working order and each flasher shall have some type of reflective surface.

No material or equipment shall be stored where it will interfere with the safe passage of public traffic, and at the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the roadway open for use by the public traffic. Spillage resulting from hauling operations along or across any public traveled way shall be removed promptly.

Whenever the Contractor's operations require one-way traffic or create a condition hazardous to the public traffic, he shall provide and station competent flagmen whose sole duties consist of directing the movement of traffic through or around the work.

The following paragraph shall be added to Section 7-10.1 Traffic and Access of the Standard Specifications: The Contractor shall also furnish such flaggers as are necessary to give adequate warning to traffic or to the public of any dangerous conditions to be encountered and payment therefore shall be considered as included in the various items bid.

7.08 Contractor's Liability

The Contractor shall save, keep, defend, indemnify, and hold harmless the City, the City Engineer, its officers or agents against and from all claims and liability for damage to property or for personal injury received by reasons of or in the course of performing the work authorized under this Contract

which may be occasioned by any act or omission on the part of the Contractor, his agents or employees.

7.09 Personal Liability

Neither the City nor any officer or authorized agent of the City shall be personally responsible for any liability arising under the Contract.

7.10 Contractor's Responsibility for Work

Until the formal acceptance of the work by the City, the Contractor shall have the charge and care thereof and shall bear the risk of accident, loss or damage to any part thereof by the action of the elements or from any other cause whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before its completion and acceptance, and shall bear the expense thereof, except for such injuries or damages as are occasioned by acts of the Federal Government or the public enemy. In case of suspension of work from any cause whatever, the Contractor shall be responsible for all materials and shall properly store them if necessary and shall erect temporary protective structures where necessary.

7.11 Notice and Service Thereof

Any notice required or given by one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notices shall not be effective for any purpose whatsoever unless served in the following manner, namely:

Notice shall be given to the City by personal delivery thereof to the Engineer or by depositing the same in the United States Mail enclosed in a sealed envelope with postage prepaid, addressed to:

City of Loma Linda
Attention: Director of Public Works
25541 Barton Road
Loma Linda, CA 92354

Notice shall be given to the Contractor, by personal delivery thereof to said Contractor or to his authorized representative at the site of the project, or by depositing the same in the United States Mail, enclosed in a sealed envelope addressed to said Contractor at the address established for the conduct of the work under this Contract, with postage prepaid.

Notice shall be given to the Surety, or any other person by personal delivery to said Surety or other person, or by depositing the same in the United States Mail, enclosed in a sealed envelope addressed to such Surety or persons at the address of said Surety or persons last communicated by him to the party giving the notice, with postage prepaid.

7.12 Warranty of Title

No materials, supplies or equipment for the work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants clear and good title to all materials, supplies, and equipment installed and incorporated in the work, and agrees upon completion of all work to deliver the premises, together with all improvements and appurtenances constructed or placed thereon by him, to the City free from any claim, liens, encumbrances, or charges, and further agrees that neither he nor any person, firm, or corporation furnishing any material or labor for any work covered by the Contract shall have any right to a lien upon the premises or any improvement or appurtenance thereon, provided that this shall not preclude the Contractor from installing metering devices or other equipment of utility companies the title of which is commonly retained by the utility company. Nothing contained in this article, however, shall defeat or impair the right of such persons furnishing materials or labor under any bond given by the Contractor for their protection, or any right under any law permitting such persons to look to funds due the Contractor, which are in the hands of the City. The provisions of this article shall be inserted in all subcontracts and material contracts, and notices of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

7.13 Termination for Breach

If the Contractor refuses or fails to prosecute the work or any separable part thereof with such diligence as will insure its completion within the time specified herein or any extension thereof, or fails to complete such work within time, or if the Contractor should be adjudged a bankrupt, of if he should make a general assignment for the benefit of his creditors or if a receiver should be appointed on account of his insolvency, or if he or any of his Subcontractors should violate any of the provisions of this Contract, the City may serve written notice upon the Contractor and his Surety of its intention to terminate this Contract, said notice to contain the reasons for such intention to terminate this Contract, and unless within ten (10) days after the service of such notice, shall cease and satisfactory arrangements for the corrections thereof be made, this Contract shall upon the expiration of said ten (10) days, cease and terminate.

In the event of any such termination, the City shall immediately serve written notice thereof upon Surety and the Contractor, and the Surety shall have the right to take over and perform the Contract, providing, however, that if the Surety within fifteen (15) days after serving upon it of a notice of termination does not give the City written notice of its intention to take over and perform the Contract, or does not commence performance thereof within (30) days from the date of serving said notice, the City may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable, at the expense of the Contractor, and his Surety shall be liable to the City for any excess cost or other damage occasioned the City hereby, and in such event, the City may, without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plants, and other property belonging to the Contractor that may be on the site of the work and be necessary therefore.

7.14 Unforeseen Difficulties

All loss or damage arising out of the nature of the work to be done under the Contract, or from any unforeseen obstructions or difficulties which may be encountered during the progress of the work and in the prosecution of the same, or from the action of the elements, or from encumbrances on the line of the work, shall be sustained by the Contractor.

7.15 Provision for Emergencies

Unusual conditions may arise on the work which will require that immediate and unusual provision be made to protect the public from danger or loss or damage to life and property, due directly or indirectly to the prosecution of the work, and it is part of the service required of the Contractor to make such provisions and to furnish such protection.

The Contractor shall use such foresight and shall take such steps and precautions as his operations make necessary to protect the public from danger or damage, or loss of life or property, which would result from the interruption or contamination of public water supply, irrigation or other public service or from the failure of partly completed work.

Whenever, in the opinion of the City, an emergency exists against which the Contractor has not taken sufficient precautions for the safety of the public or the protection of utilities or of adjacent structures or property which may be injured by process of construction on account of such neglect; and whenever, in the opinion of the City immediate action shall be considered necessary in order to protect public or private personnel or property interests, or prevent likely loss of human life or damage on account of the operation under the contract, then and in that event the City may provide suitable protection to said interest by causing such work to be done and material to be furnished, as, in the opinion of the City, may seem reasonable and necessary.

The cost and expense of said labor and material, together with the cost and expense of such repairs as may be deemed necessary, shall be borne by the Contractor, and if he shall not pay said cost and expense upon presentation of the bills therefore, duly certified by the Engineer, then said cost and expense will be paid by the City and shall thereafter be deducted from any amounts due, or which may become due said Contractor. Failure of the City, however, to take such precautionary measure, shall not relieve the Contractor of his full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the City.

7.16 Existing Utilities

The Contractor shall notify the various gas, power, telephone, irrigation, or other utility companies or districts, 48 hours in advance of his intention to begin work so that they may take any necessary protective measures around their facilities. Whenever the improvement requires the relocation or replacement of an existing utility under the contract, this information will be shown on the contract

drawings. Unless this notation is shown on the contract drawings, the Contractor shall assume that the utility is to remain in place or be relocated or replaced by others.

The Contractor is responsible for the protection of any utilities and for any damage to any such utility during the prosecution of the work. Any damage to a utility shall be repaired to the satisfaction of the organization owning the facility. The City reserves the right, is so requested by the owner, to permit the owner to repair such damage, and all expenses of whatever nature arising from such damage shall be bome by the Contractor.

7.17 Preservation of Property

Trees and shrubbery that are not shown on the Plans to be removed, pole lines, fences, signs, survey markers and monuments, buildings, structures, conduits, pipelines, and other improvements and facilities adjacent to the work shall be protected from injury or damage and if ordered by the Engineer, the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operation, they shall be replaced or restored to a condition as good as when the Contractor entered upon the work.

7.18 Cooperation With Others

Nothing contained in these documents shall be interpreted as granting to the Contractor exclusive occupancy of the construction site for the work. Should construction be under way or subsequently begin by other forces or by other Contractors within or adjacent to the limits of the work, or in the vicinity of the work to be done under this contract, the Contractor shall so conduct his operations as to interfere to the least possible extent with the work of such other forces or contractors. If the performance of this contract is likely to be interfered with by the simultaneous performance of some other forces or Contractors, the Engineer shall decide which Contractor shall continue or whether the work can be coordinated so that the contractors may proceed simultaneously.

Any difference or conflicts, which may arise between the Contractor and such other forces or contractors, or between the Contractor and subcontractor under him because of delays or hindrance to each other, shall be adjusted and determined by the Engineer. If the work of the Contractor is delayed because of any acts or omissions of any other Contractor or force, the Contractor shall on that account have no claim for additional compensation or extra cost against the City.

7.19 Notice to Contractor and Surety

It is acknowledged that nothing in the performance of the Engineer's services in connection with this project implies any undertaking for the benefit of, or which may be enforced by the Contractor, its subcontractors, or the surety of any of them, it being understood that the Engineer's obligations

are solely to the City and that, in meeting such obligations, the Engineer may increase the burdens and expenses of the Contractor, its subcontractors, or the surety of any of them.

7.20 Resolution of Contract Disputes

Resolution of contract disputes shall be carried out pursuant to Article 1.5, Chapter 1, Part 3 of Division 2 of the Public Contracts Code, commencing at Section 20104. These sections of the Public Contracts Code prescribe a process utilizing informal conferences, nonbinding judicially supervised mediation, judicially supervised arbitration, and trial as the process to resolve disputes. This process relates to claims of $375,000.00 or less.

SECTION 8 - MEASUREMENT AND PAYMENT

8.01 Payment

The prices paid for the various items in the proposal shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and doing all work necessary to complete the finished product as provided in the plans and these specifications.

8.02 Work to be done Without Direct Payment

Whenever it is specified that the Contractor is to do work or furnish materials of any class for which no price is fixed in the Proposal, it shall be understood that he is to do such work or furnish such materials without extra charge or allowance or direct payment of any kind. The cost of doing such work or furnishing such materials is to be included in the price bid for such other items of work, as he may consider appropriate.

8.03 Measurement of Quantities

Payment for all work bid at a price per unit of measurement will be based upon the actual quantities of work as measured upon completion. The City does not expressly or by implication agrees that the actual amount of work or materials of any class will correspond to the estimated quantities given in the Proposal. The Contractor shall make no claim for anticipated profits, for loss of profit, for damages or for any extra payment because of any difference between the amounts of work done or materials furnished and the estimated amount. Item bid on a Lump Sum, basis shall result in a complete structure, operating plant or system in satisfactory working condition in respect to the functional purpose of the installation and no extra compensation will be allowed for anything omitted but fairly implied.

8.04 Change Order

When alterations in quantities of work for which prices are shown in the Proposal are ordered and performed, the adjustment in the Contract amount shall be determined on the basis of such unit prices as directed in the Standard Specifications. A change order will be prepared by the Engineer and signed by the Contractor and the City to approve the change in the Contract amount. No extra work shall be performed unless a written change order has been issued by the City stating that the extra work is authorized, and no claim for an addition to the Contract amount shall be valid unless so ordered.

Any amount to be paid the Contractor for extra work by reason of a change order shall be determined by one of the following:

a. Lump Sum Price - An acceptable lump sum proposal from the Contractor.

b. Unit Prices - Unit prices fixed by agreement between the Engineer and the Contractor.

c. 1 Force Account - Ordering the Contractor to proceed with the work and keep and present an itemized breakdown of the cost of the change, together with all vouchers therefore. Equipment rental rates for contractor owned equipment shall be per the State of California, Department of Transportation Labor Surcharge and Equipment Rental Rates effective at the time the work was performed. To the totals computed for labor, material, equipment rental, and other services and expenditures authorized by the change order will be added the following percentages for profit and overhead:

Labor	20%
Materials	15%
Equipment Rental	15%
Other Services & Expenditures	15%

There shall be no additional compensation for bonding.

c. 2 Work by Subcontractor - When all or any part of the extra work is performed by a subcontractor, the markup established in Section 9.04 (c) 1 shall be applied to the subcontractor's actual cost of such work to which a markup of 5% may be added by the Contractor.

There shall be no additional compensation for bonding.

8.05 Retention of Imperfect Work

If any portion of the work done or materials furnished under the contract shall prove defective or not in accordance with the specifications and contract drawings, and if the imperfection in the same shall not be of sufficient magnitude or importance to make the work dangerous or undesirable, or if the removal of such work is unpractical or will create conditions which are dangerous or undesirable, the Engineer shall have the right and authority to retain the work instead of requiring it to be removed and reconstructed, but he shall make such deductions therefore in the payment due the Contractor as may be just and reasonable.

8.06 Liquidated Damages

It is agreed by the parties to the contract that in case all the work called for under the contract is not completed before or upon the expiration of the time limit as set forth in these specifications, damage will be sustained by the City of Loma Linda and that it is and will be impracticable to determine the actual damage which the City of Loma Linda will sustain by reason of such delay, and it is therefore agreed that the Contractor will pay to the City of Loma Linda the sum as specified in the Proposal per day for each and every day's delay beyond the time prescribed to complete the work; and the Contractor agrees to pay liquidated damages as herein provided, and in case the same are not paid, agrees that the City of Loma Linda may deduct the amount thereof from any money due **or** that may become due the Contractor under the contract.

The Contractor shall not be assessed with liquidated damages, nor the cost of engineering and inspection during any delay in the completion of the work caused by Acts of God or of the public enemy, acts of the Federal Government, City, fire, floods, epidemics, severe weather or delays of subcontractors due to such causes; provided that the Contractor shall within ten (10) days from the beginning of such delay notify the Engineer in writing of the causes of delay, who shall ascertain the fact and extent of the delay, and his finding of the facts thereon shall be final and conclusive.

Acceptance of any progress payment accompanying any estimate without written protest shall be an acknowledgment by the Contractor that the number of accumulated contract days shown on the associated Statement of Working Days is correct.

Progress payments made by the City of Loma Linda to the Contractor after the completion date of the contract shall not constitute a waiver of liquidated damages.

8.07 Progress Payments

All monies due the Contractor under the contract will be paid by a Demand on the City, prepared and approved as required by law, and it is understood that any delay in the preparation, approval and payment of these demands will not constitute a breach of contract on the City.

The Contractor shall, on the first day of each month, submit to the Engineer a written progress estimate of the total amount of work done. The City Engineer will review the estimate and approve it or notify the Contractor of any exceptions. The City shall retain ten percent (10%) of the estimated value of the work done and will monthly pay to the Contractor the balance, after deducting all previous payments and all sums to be kept or retained under the provisions of this contract. No such progress payment or estimate shall be required to be made when the total number of working days is 30 or less, or when in the judgment of the Engineer the work is not proceeding in accordance with provisions of the contract, or when the value of the work amounts to less than five hundred dollars ($500.00). No such estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

8.08 Final Payment and Release of Retention

After all work has been completed and accepted by the Engineer, the Contractor shall submit a final payment request to the Engineer. The Engineer will determine the quantity of work performed and prepare the final estimate. From this estimate, 10 percent will be deducted and retained by the City and the remainder less the amount of all previous payments and any deductions allowed by the Contract will be paid to the Contractor.

At the expiration of 35 days from the recordation of the Notice of Completion, the amount deducted from the final estimate and retained by the City will be paid to the Contractor except such amounts as are required by law to be withheld by properly executed and filed notices to stop payment or as may be authorized by the Contract to be further retained.

SPECIAL PROVISIONS - TECHNICAL

9.01 General - Scope of Work

A. The City of Loma Linda, California is seeking proposals from qualified vendors for the construction of a fiber optic broadband access network backbone composed of fiber optic cable rings. The network will be based upon Ethernet design principals. The desired network will be built with regard to IEEE 802.3ah recommendations.

B. The City of Loma Linda is a municipal utility provider and has the necessary authority to install and operate a commercial broadband information system within the city's utility service area.

C. The City has completed a detailed engineering analysis of the proposed network. The analysis was completed in May 2004. Bids are solicited on the basis of the analysis results. Growth has occurred and will continue to occur. Bids will match the 5/2004 data and will be contrasted to Pro Forma information compiled at that time. Additional requirements dictated by growth will be engineered and priced as a change order if needed.

D. Loma Linda is experiencing residential growth in excess of 5% per year.

E. The initial service offerings expected to transit the broadband system are:

   a. Cable Television Services
   b. Pay per view television services
   c. Video on Demand
   d. High speed internet access services
   e. Internet Protocol (IP) telephone services

F. The RFP enumerates requirements for the following elements of the optical fiber network rings:

   a. Single-mode optical fiber cable to be used in the backbone ring and lateral feeder portions of the network
   b. Hardware for splicing and termination of optical fiber cable including patch panels, indoor splice housings, and outside plant splice closures and housings
   c. Optical fiber cable assemblies including patch cords and pigtails
   d. Installation services of the aforementioned optical fiber cable and hardware
   e. Post-installation testing of all installed network components
   f. Documentation of all installation services provided

G. The city backbone ring network shall be designed to serve a minimum of 23,040 subscribers.

H. Lateral feeds from the backbone rings and subsequent network infrastructure will be completed at a later time and are not included in the scope of this RFP.

I. Bidders should propose systems designed to deliver the network as diagrammed in Attachment 1, City of Loma Linda Fiber Optic Broadband Access Network Backbone Ring Network drawing.

The Contractor shall furnish and install all materials and labor as shown on the drawings and as specified herein, as required for a complete and workable system. All materials shall be as indicated on the drawings or specified herein.

9.02 Time of Completion

The Contractor shall complete the work within 70 working days from the commencement date specified on the Notice to Proceed document.

9.03 Coordination and Cooperation

The Contractor shall be responsible for all coordination of work including, but not limited to, making arrangements for waterline shutdowns with the City of Loma Linda.

The Contractor shall cooperate with the City and shall not interfere with the operation of the water system.

Arrangements shall be made with the Public Works Department a minimum of forty-eight (48) hours in advance to coordinate waterline shutdowns and other work, which may affect the operation of the water system. At no time shall the Contractor operate existing valves without the permission of the Engineer.

9.04 Existing Utilities

The Contractor's attention is directed to Section 5, Utilities, of the Standard Specifications, Section 7.16, Existing Utilities, of these specifications and the general notes shown on the plans.

Potholing of existing utilities shall be the first order of work. The Contractor shall verify both the horizontal and vertical locations of the utilities 4-inch diameter and larger shown on the plans. The Contractor shall protect the utilities in place except where otherwise shown on the plans or directed by the Engineer. The Contractor will be responsible for adjusting the location of the proposed waterline facilities to avoid existing utilities. Full compensation to avoid and protect existing utilities including adjustment of the proposed waterline location shall be considered as included in the various contract items bid and no additional compensation will be allowed therefore.

Where redesign of the waterline is necessary by the Engineer, the Contractor may be granted a time extension.

Payment to pothole existing utilities and verify their locations shall be at the lump sum price bid and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in locating existing utilities.

9.05 Removal and Disposal of Materials

Removal and disposal of materials shall comply with Section 300-1.3, Removal and Disposal of Materials, of the Standard Specifications and these Special Provisions.

All asphalt and portland cement concrete to be removed shall be saw cut.

All existing valves, fittings, etc., required to be removed that the City desires to salvage shall be delivered to the City Yard by the Contractor.

Compensation for removal and disposal of materials shall be considered as included in other items or work and no additional compensation will be allowed therefore.

9.06 Materials List

Prior to ordering any materials, the Contractor shall submit to the Engineer for approval a list indicating all materials to be used. In addition to the materials list, the Contractor shall submit product literature for all materials to be used. The Engineer shall approve or disapprove the materials list within five (5) working days upon receipt of said list. Materials shall not be ordered by the Contractor until the Engineer has approved the materials list.

The materials list and product literature shall be submitted in four copies.

Full compensation for furnishing the materials list shall be considered as included in other items of work and no additional compensation will be allowed therefore.

9.07 THE OPTICAL FIBER BACKBONE NETWORK

A. The Optical Fiber Backbone Network shall be constructed of 4 cable rings serving each of four quadrants of the city. The optical fiber backbone cables shall utilize 6 fibers for every 160 customers for the bi-directional transport of voice, high speed Internet data, and internet protocol (IP) video. Each group of 6 fibers will be utilized in a ring configuration to accommodate redundant service to each group of 160 customers. Two cable rings will be constructed with 288-fiber cable; two more rings will be constructed with 144-fiber cable. The 4 rings will be capable of supplying network services to 23,040 subscribers in a mix of single family residences, multiple-dwelling units, and single-tenant and multiple-tenant businesses.

B. The optical fiber backbone network shall follow IEEE 802.3ah standard definitions of link configurations as described herein and shall consist of single mode optical fibers and passive optical components, primarily optical connectors and hardware. The maximum length of any given optical fiber link shall be 20 km.

4. NETWORK ARCHITECTURE

The network is based upon a four-tier cable plant, as described below. The first and second tiers are within the scope of this RFP. The third and fourth tiers are not within the scope of this RFP and will be constructed at a later time

Included in this RFP

Tier 1: Four main Backbone Ring Cables beginning and ending at the CO / Head End

Tier 2: Lateral Feeder Cables connecting the Backbone Rings to the Main Distribution Frames (MDFs) spread throughout the network

Not included in this RFP (Refer to the City of Loma Linda Connected Community, Design, Installation and Product Specification).

Tier 3: Distribution Cables routed through the housing developments, neighborhoods, and commercial areas within the city

Tier 4: Drop Cables connecting subscribers to the Distribution Cables via Network Access Points.

5. OPTICAL CABLE FOR DUCT OR AERIAL INSTALLATION

5.1. The Optical Fiber Cable for duct or aerial installation shall be Corning Cable Systems part number XXXEW4-T4101A20, where "XXX" in the part number represents the fiber count. For example, a 12 fiber cable will have part number 012EW4-T4101A20. The Optical Fiber Cable for duct or aerial installation shall meet the requirements listed below.

5.1.1. The cable shall meet all requirements stated in this specification. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999.

5.2. Fiber Characteristics

5.2.1. Detailed information on the fiber included in this cable design can be found in section 7 below titled, OPTICAL FIBER.

5.3. Specifications for Outdoor Cable Construction

5.3.1 Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be either 2.5 mm or 3.0 mm.

5.3.2 Each buffer tube shall contain up to 12 fibers.

5.3.3 The fibers shall not adhere to the inside of the buffer tube.

5.3.4 Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding."

5.3.5 The fibers shall be colored with ultraviolet (UV) curable inks.

5.3.6 Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding."

5.3.6.1 Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

5.3.7 For cables containing more than 12 buffer tubes, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

5.3.8 In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto each other or into the gel filling material. Colors shall not cause fibers to stick together.

5.3.9 The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrink-back requirements of 7 CFR 1755.900.

5.3.10 Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 2.5 mm or 3.0 mm in outer diameter.

5.3.11 The central member shall consist of a dielectric, glass reinforced plastic (GRP) rod (optional steel central member). The purpose of the central member is to provide tensile strength and prevent buckling. The central member shall be over-coated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

5.3.12 Each buffer tube shall be filled with a non-hygroscopic, non-nutritive to fungus, electrically non-conductive, homogenous gel. The gel shall be free from dirt and

foreign matter. The gel shall be readily removable with conventional nontoxic solvents.

5.3.13 Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process. Water swellable yarn(s) shall be applied longitudinally along the central member during stranding.

5.3.14 Two polyester yarn binders shall be applied contrahelically with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

5.3.15 For single layer cables, a water swellable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

5.3.16 For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two layer core. A water swellable tape shall be applied longitudinally over both the inner and outer layer. The water swellable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

5.3.17 Non-armored cables shall contain one ripcord under the sheath for easy sheath removal. Armored cables shall contain two ripcords under the steel armor for easy armor removal. Additionally, armored cables that have an inner sheath will also contain one ripcord under the inner sheath.

5.3.18 Tensile strength shall be provided by the central member, and additional dielectric yarns as required.

5.3.19 The dielectric yarns shall be helically stranded evenly around the cable core.

5.3.20 Non-armored cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. See Figure 1.

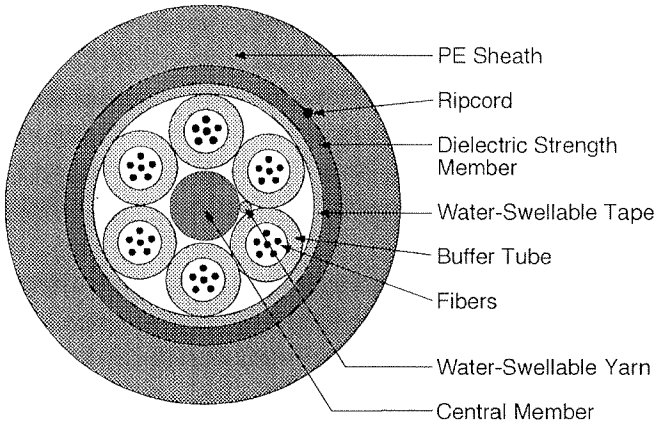

Figure 1

5.3.21 Armored cables without an inner jacket shall have an armor layer applied directly over the dielectric strength members (if present). The armor shall be a corrugated steel tape, plastic-coated on both sides for corrosion resistance, and shall be applied around the outside of the dielectric strength members (if present) with an overlapping seam with the corrugations in register. The outer jacket shall be applied over the corrugated steel tape armor. The outer jacket shall be a MDPE with a minimum nominal jacket thickness of 1.4 mm. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. See Figure 2.

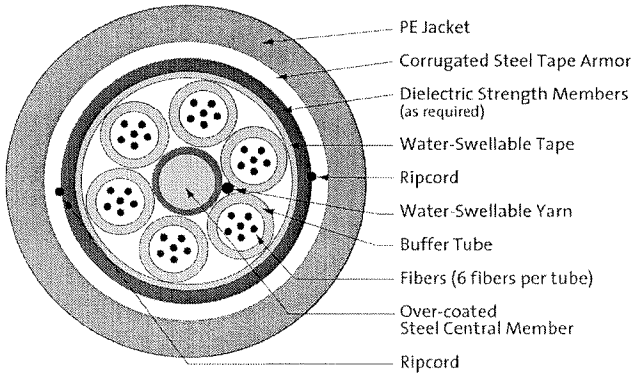

Figure 2

5.3.22 Armored cables with an inner jacket shall have an inner sheath of MDPE. The minimum nominal jacket thickness of the inner sheath shall be 1.0 mm. The inner jacket shall be applied directly over the tensile strength members (as required) and water swellable tape. A water swellable tape shall be applied longitudinally around the outside of the inner jacket. The armor shall be a corrugated steel tape, plastic-coated on both sides for corrosion resistance, and shall be applied around the outside of the water blocking tape with an overlapping seam with the corrugations in register. The outer jacket shall be applied over the corrugated steel tape armor.

The outer jacket shall be a MDPE with a minimum nominal jacket thickness of 1.4 mm. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. See Figure 3.

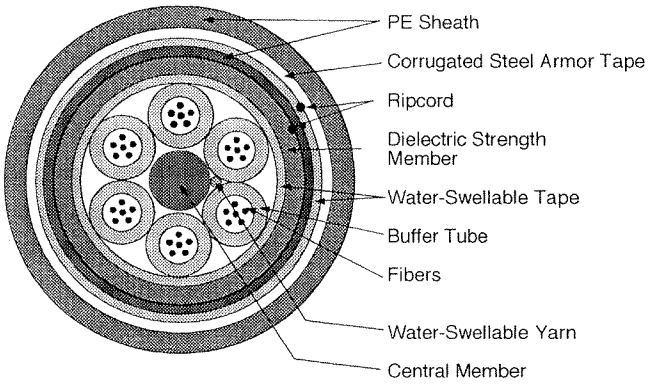

Figure 3

5.3.23 The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.

5.3.24 The jacket or sheath shall be free of holes, splits, and blisters.

5.3.25 The cable jacket shall contain no metal elements and shall be of a consistent thickness.

5.3.26 Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (NESC), fiber count, and fiber type. The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more coextruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

5.3.27 If the initial marking fails to meet the specified requirements (i.e., improper text statement, color, legibility, or print interval), the cable may be remarked using a contrasting alternate color. The numbering sequence will differ from the previous numbering sequence, and a tag will be attached to both the outside end of the cable and to the reel to indicate the sequence of remarking. The preferred remarking color will be yellow, with the secondary choice being blue.

5.3.28 The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

5.3.29 The shipping, storage, and operating temperature range of the cable shall be -40°C to +70°C. The installation temperature range of the cable shall be –30°C to +70°C.

5.4. General Cable Performance Specifications

5.4.1 When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB/km at 1300 nm for multimode fiber.

5.4.2 When tested in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable," a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.

5.4.3 When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable," the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 70°C.

5.4.4 When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm (63 lbf/in). Alternatively, it is acceptable to remove the 220 N/cm (125 lbf/in) load entirely and apply the 110 N/cm (63 lbf/in) load within five minutes at a rate of 2.5 mm (0.1 in) per minute. The 110 N/cm (63 lbf/in) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm (63 lbf/in) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.

5.4.5 When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

5.4.6 When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," except that the number of cycles shall be two at three locations along a one meter cable length and the impact energy shall be atleast 4.4 Nm (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

5.4.7 When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a rated tensile load of 2670N (601 lbf) and residual load of 30% of the rated installation load. The axial fiber strain shall be $\leq$ 60% of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be $\leq$ 20% of the fiber proof

level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multimode fiber.

5.4.8 When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

5.4.9 When tested in accordance with FOTP-181, "Lightning Damage Susceptibility Test for Optic Cables with Metallic Components," the cable shall withstand a simulated lightning strike with a peak value of the current pulse equal to 105 kA without loss of fiber continuity. A damped oscillatory test current shall be used with a maximum time-to-peak value of 15 μs (which corresponds to a minimum frequency of 16.7 kHz) and a maximum frequency of 30 kHz. The time to half-value of the waveform envelope shall be from 40 to 70 μs.

5.4.10 When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable," the cable shall withstand four full turns around a mandrel of ≤ 20 times the cable diameter after conditioning for four hours at test temperatures of -30°C and +60°C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.

5.5. Quality Assurance Provision

5.5.1 All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

5.5.2 The cable manufacturer (Corning) shall be TL 9000 registered.

5.6. Packaging

5.6.1 The completed cable shall be packaged for shipment on non-returnable wooden reels. Required cable lengths shall be stated in the purchase order.

5.6.2 Top and bottom ends of the cable shall be available for testing.

5.6.3 Both ends of the cable shall be sealed to prevent the ingress of moisture.

5.6.4 Each reel shall have a weather resistant reel tag attached identifying the reel and cable.

The reel tag shall include the following information:

Cable Number Gross Weight

Shipped Cable Length in Meters
Corning Product Number
Date Cable was Tested
Cable Length Markings
a: Top (inside end of cable)
b: Bottom (outside end of cable)

Job Order Number
Customer Order Number
Corning Order Number
Item Number

The reel (one flange) marking shall include:

"Corning Cable Systems"
Country of origin (e.g., USA)
An arrow indicating proper direction of roll when handling
Fork lift-handling illustration
"DO NOT SHIP REEL ON SIDE" or
"DO NOT LAY REEL ON ITS SIDE"

5.6.5 Each cable shall be accompanied by a cable data sheet.

The cable data sheet shall include the following infomation:

Corning Cable Number
Corning Factory Order Number
Alternate Customer
Customer Purchase Order Number
Mark for Information
Maximum Billable Length
Measured Attenuation of Each Fiber
(for lengths > 1000 m)

Corning Product Number
Customer Name
Customer Cable Number
Alternate Code
Ordered Length
Actual Shipped Length
Bandwidth Specification
(where applicable)

5.7. Miscellaneous

5.7.1 At the request of the customer, the cable manufacturer (Corning) shall provide installation procedures and technical support concerning the items contained in this specification.

A. Outside Plant Optical Cables must conform to the requirements of Telcordia GR-20-CORE, Issue 2.

B. Additional minimum specifications are:

- Zero water peak
- Minimal or zero filling compound
- Single-mode
- Matched clad
- 0.35 / 0.25 dB attenuation per kilometer at 1310 / 1550 nm
- Dielectric strength members
- Steel armor layer
- Metallic sheath

- Central tube
- Buffer tubes
- Central strength member
- Dielectric Strength Elements
- Outer PE Jacket
- Ripcord
- Steel Armor
- Inner PE Jacket
- Blocking Material
- Central Member Jacket

6. OPTICAL FIBER CABLE FOR DIRECT INSTALATION IN THE ROAD

6.1 The Optical Fiber Cable for installation in the road shall be Corning Cable Systems part number XXXEMC-13101R20, where "XXX" in the part number represents the fiber count. For example, a 12 fiber cable will have part number 012EMC-13101R20. The optical Fiber Cable for installation in the road shall meet the requirements listed below.

The cable is designed for direct buried deployment in roads, parking lots, sidewalks and soil. A UV resistant cable jacket is required for aerial applications.

The cable shall meet all requirements stated in this specification. The cable shall meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999.

6.2 Fiber Characteristics

6.2.1 Detailed information on the fiber included in this cable design can be found in section 7 below titled, OPTICAL FIBER.

6.3 Specifications for Outdoor Cables

6.3.1 Optical fibers shall be placed inside a central copper tube.

6.3.2 The colored fibers shall not adhere to the inside of the copper tube.

6.3.3 Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding."

6.3.4 The fibers shall be colored with ultraviolet (UV) curable inks.

6.3.5 The central copper tube shall contain up to 144 colored fibers. For fiber counts greater than 12, color coded binders shall be used to segregate the fibers into color

coded groups. To the extent possible, colored fibers shall be segregated in groups of 12.

Available fiber counts shall be dependent upon fiber type as follows:

SMF-28, SMF-28e, and MetroCor Fiber:
Available in fiber counts from 6-60 in a 7.0 mm cable and from 72 to 144 in a 9.5mm cable.

Multimode and LEAF Fiber:
Available in fiber counts from 6-48 in a 7.0 mm cable and from 60 to 96 in a 9.5mm cable.

6.3.6 The binders shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding."

6.3.7 The central buffer tube shall be filled with a non-hygroscopic, non-nutritive to fungus, electrically non-conductive, homogenous gel. The gel shall be free from dirt and foreign matter. The gel shall be readily removable with conventional nontoxic solvents.

6.3.8 The central copper tube shall be surrounded by a high density polyethylene (HDPE) jacket which shall be yellow for cables with single-mode fiber, orange for cables with multimode fibers, or black for hybrid cables containing both single-mode and multimode fibers. The nominal jacket thickness shall be 0.95 mm. The jacket shall not promote the growth of fungus. See Figure 1.

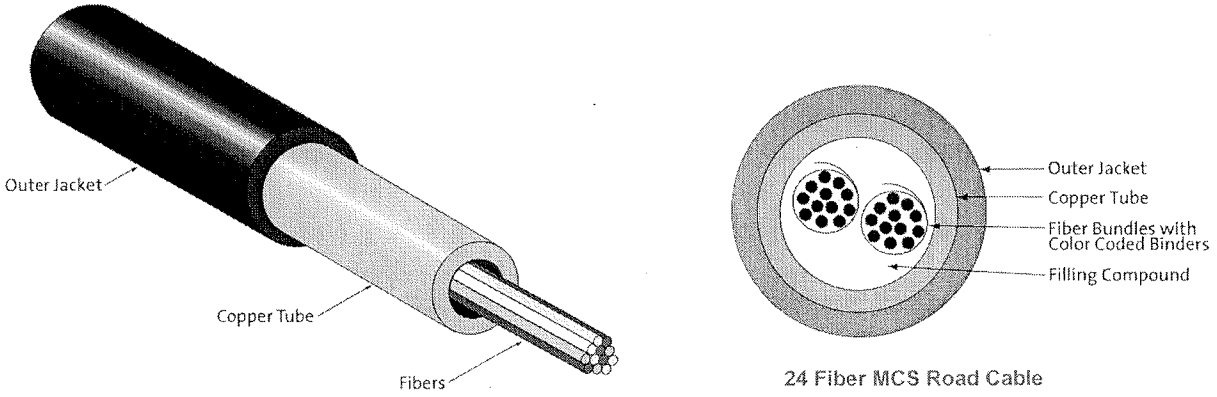

FIGURE 1

6.3.9 The jacket shall be free of holes, splits, and blisters.

6.3.10 Cable jackets shall be marked with manufacturer's name, month and year of manufacture, sequential meter markings, a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code® (NESC®), Fiber count, and Fiber type. The actual length of the cable shall be within -0/+1% of the

length markings. The print color shall contrast with the cable jacket. The height of the marking shall be approximately 2.5 mm.

6.3.11 If the initial marking fails to meet the specified requirements (i.e., improper text statement, color, legibility, or print interval), the cable may be remarked using a contrasting alternate color. The numbering sequence will differ from the previous numbering sequence, and a tag will be attached to both the outside end of the cable and to the reel to indicate the sequence of remarking.

6.3.12 The maximum pulling tension shall be 2700 N (600 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

6.3.13 The shipping and storage temperature range of the cable shall be -40°C to +70°C. The operating temperature range of the cable shall be -40°C to +70°C. The installation temperature range of the cable shall be -30°C to +70°C.

6.4 General Cable Performance Specifications

6.4.1 When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40 °C to +70 °C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

6.4.2 When tested in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable," a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for 1 hour without leakage through the open cable end.

6.4.3 When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable," the cable will exhibit no flow (drip or leak) of filling and/or flooding material at 70°C.

6.4.4 When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 440 N/cm (250 lbf/in) applied uniformly over the length of the sample. The load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 440 N/cm (250 lbf/in) load. The magnitude of the maximum attenuation change of each individual fiber will not be greater than 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

6.4.5 When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for

multimode fiber.

6.4.6 When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," except that the number of cycles shall be two at three locations along a one meter cable length and the impact energy shall be at least 4.4 Nm, the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

6.4.7 When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable will withstand a rated tensile load of 2700 N (600 lbf) and residual load of 30% of the rated installation load. The axial fiber strain shall be ≤ 60% of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be ≤ 20% of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.3 dB at 1300 nm for multimode fiber.

6.4.8 When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

6.4.9 When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable," the cable shall withstand four full turns around a mandrel of ≤ 20 times the cable diameter for non-armored and armored cables after conditioning for four hours at test temperatures of -30°C and +60°C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears or other openings. Additionally, the central copper tube shall not exhibit visible cracks. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

6.5 Quality Assurance Provision

6.5.1 All cabled optical fibers greater than 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

6.5.2 The cable manufacturer (Corning) shall be ISO 9000 registered.

6.6 Packaging

6.6.1 The completed cable shall be packaged for shipment on non-returnable wooden reels. Required cable lengths shall be stated in the purchase order.

6.6.2 Top and bottom ends of the cable shall be available for testing.

6.6.3 Both ends of the cable shall be sealed to prevent the ingress of moisture.

6.6.4 Each reel shall have a weather resistant reel tag attached identifying the reel and cable.

The reel tag shall include the following information:

Cable Number
Shipped Cable Length in Meters
Manufacturer Product Number
Date Cable was Tested
Cable Length Markings
A: Top (Inside End of Cable)
B: Bottom (Outside End of Cable)
Gross Weight
Job Order Number
Customer Order Number
Manufacturer Order Number
Item Number

The reel (one flange) marking shall include:

Manufacturer
Country of origin (i.e. USA)
An arrow indicating proper direction of roll when handling
Fork lift handling illustration
"DO NOT SHIP REEL ON SIDE" or "DO NOT LAY REEL ON ITS SIDE"

6.6.5 Each cable shall be accompanied by a cable data sheet.

The cable data sheet shall include the following information:

Manufacturer Cable Number
Manufacturer Factory Order Number
Alternate Customer
Customer Purchase Order Number
Mark for Information
Maximum Billable Length
Measured Attenuation of Each Fiber (for lengths > 1000 m)
Manufacturer Product Number
Customer Name
Customer Cable Number
Alternate Code
Ordered Length
Actual Shipped Length
Bandwidth Specification (where applicable)

6.7 Miscellaneous

6.7.1 At the request of the customer, the cable manufacturer (Corning) shall provide installation procedures and technical support concerning the items contained in this specification.

6.8 Intellectual Property

6.8.1 Corning Cable Systems or its affiliates own granted and pending patents covering installations of optical fiber cable products buried directly in the road, parking lot, or sidewalk, including US Patent No. 6,371,691. Corning Cable Systems is willing to grant licenses under reasonable terms and conditions being a label license for installations of this type MCS Road Cable manufactured by Corning Cable Systems or its affiliates. Using MCS Road Cable, manufactured by Corning Cable Systems or its affiliates, is required to meet the intent of a label license. Send intellectual property related inquiries to Patent Counsel, Corning Cable Systems, Hickory, NC.

7. OPTICAL FIBER

7.1. The Optical Fiber shall be Corning SMF-28e and shall meet the following requirements.

7.1.1 All fibers in the cable must be usable and meet required specifications.

6.1.2 Each optical fiber shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification.

7.1.3 Each optical fiber shall consist of a germania-doped silica core surrounded by a concentric glass cladding. The fiber shall be a matched clad design.

7.1.4 Each optical fiber shall be proof tested by the fiber manufacturer at a minimum of 100 kpsi (0.7 GN/m^2).

7.1.5 The fiber shall be coated with a dual layer acrylate protective coating. The coating shall be in physical contact with the cladding surface.

7.1.6 The attenuation specification shall be a maximum value for each cabled fiber at 23 ± 5 °C on the original shipping reel.

7.2. Single-mode (Dispersion Un-shifted)

The single-mode fiber shall meet EIA/TIA-492CAAA, "Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers," and ITU recommendation G.652, "Characteristics of a single-mode optical fibre cable."

Geometry		
7.2.1	Cladding Diameter (μm)	125.0 ± 0.7
7.2.2	Core-to-Cladding Concentricity (μm)	≤ 0.5
7.2.3	Cladding Non-Circularity	≤ 1.0 %
7.2.4	Mode Field Diameter (μm)	

	1310 nm 1550 nm	9.2 ± 0.4 10.4 ± 0.8
7.2.5	Coating Diameter (μm)	245 ± 5
7.2.6	Colored Fiber Nominal Diameter (μm)	253 - 259
7.2.7	Fiber Curl radius of curvature (m)	≥ 4.0 m

Optical		
7.2.8	Cabled Fiber Attenuation (dB/km) 1310 nm 1550 nm	 ≤ 0.4 ≤ 0.3
7.2.9	Point discontinuity (dB) 1310 nm 1550 nm	 ≤ 0.1 ≤ 0.1
7.2.10	Macrobend Attenuation (dB) **Turns OD** / **Mandrel** 1 / 32 ± 2 mm 100 / 50 ± 2 mm 100 / 50 ± 2 mm 100 / 60 ± 2 mm	 ≤ 0.50 at 1550 nm ≤ 0.05 at 1310 nm ≤ 0.10 at 1550 nm ≤ 0.05 at 1550 nm
7.2.11	Cable Cutoff Wavelength (λ_{ccf}) (nm)	≤ 1260
7.2.12	Zero Dispersion Wavelength (λ_0) (nm)	$1302 \leq \lambda_0 \leq 1322$
7.2.13	Zero Dispersion Slope (S_0) (ps/(nm²•km))	≤ 0.092
7.2.14	Total Dispersion (ps/(nm•km)) 1285-1330 nm 1550 nm	 ≤ 3.5 ≤ 18
7.2.15	Cabled Polarization Mode Dispersion ($ps/\sqrt{km}$)	≤ 0.5
7.2.16	IEEE 802.3 GbE - 1300 nm Laser Distance (m)	up to 5000
7.2.17	Water Peak Attenuation: 1383 ± 3 nm (dB/km)	≤ 2.1

7.3. Single-mode (Dispersion Un-shifted) with Low Water Peak

The single-mode Low Water Peak fiber utilized in the optical fiber cable shall meet EIA/TIA-492CAAB, "Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak," and ITU recommendation G.652.C, "Characteristics of a single-mode optical fibre cable." These fibers shall have the same specified performance and geometry values as standard dispersion un-shifted fiber (Section 6.2) except as noted below.

7.3.1	Mode Field Diameter (μm) 1550 nm	 10.4 ± 0.5
7.3.2	Point discontinuity (dB) 1310 nm	 ≤ 0.05

	1550 nm	≤ 0.05
7.3.3	Macrobend Attenuation (dB) **Turns** **Mandrel OD** 100 60 ± 2 mm	≤ 0.05 at 1625 nm
7.3.4	Total Dispersion (ps/(nm•km)) 1625 nm	≤ 22
7.3.5	Cabled Fiber Attenuation: 1383 ± 3 nm (dB/km)	≤ 0.4

8. OPTICAL FIBER SPLICE CLOSURES

8.1. Optical Fiber Splice Closures shall be from the Corning Cable Systems SCF family of Advanced Splice Closures. Representative part numbers for the splice closures are Corning Cable Systems part numbers:

SCF-6C22-01
SCF-6C22-02
SCF-6C28-01
SCF-6C28-02
SCF-8C28-01
SCF-8C28-02

The Optical Fiber Splice Closures shall meet the following requirements.

8.1.1 The optical fiber splice closure shall meet all requirements stated in this specification.

8.2. Splice Closure Features and Functions

8.2.1 The splice closure housing shall be non-metallic. It shall be resistant to solvents, stress cracking, and creep. The housing materials shall also be compatible with chemicals and other materials to which they might be exposed in normal applications.

8.2.2 The optical fiber closure shall be capable of accepting any optical fiber cable used in interoffice, outside plant, and building entrance facilities.

8.2.3 The optical fiber closure shall be available in distinct sizes to accommodate a variety of cable entries as specified in the table below:

Table 7-1. Cable Capacity

Cable Capacity	Canister (Butt) Configuration	Branch (In-Line) Configuration

	Express Entries/ Max. Cable Diameter (mm)	Drop Port Entries/ Max. Cable Diameter (mm)	Express Entries/ Max. Cable Diameter (mm)	Drop Port Entries/ Max. Cable Diameter (mm)
Large	2/32	6/25	4/32	12/25
Medium	2/25	4/18	4/25	8/18
Small	2/20	3/15	4/20	6/15

As an option, the ability to double the cable capacity of an installed canister splice closure by use of a kit shall be available. Such a conversion shall not disturb existing cables or splices.

8.2.4 Encapsulation shall not be required to resist water penetration.

8.2.5 The splice closure shall be re–enterable. The closure end cap shall be capable of accepting additional cables without removal of the sheath retention or strength member clamping hardware on previously installed cables or disturbing existing splices. The optical fiber splice closure shall provide a clamping mechanism to prevent pistoning of the central member or strength members and to prevent cable sheath slip or pullout.

8.2.6 The splice closure shall have appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the armored cable sheath. The cable bonding hardware shall be able to accommodate a copper conductor equal to or larger than a #6 AWG.

8.2.7 Aerial splice closures shall have available the necessary hardware to attach and secure the closure to an aerial strand.

8.2.8 The closure shall accommodate splice trays suitable for single fiber, single fiber heat shrink, mechanical, or ribbon heat shrink splices.

8.2.9 The small splice closure shall accommodate up to 72 single fiber splices or 144 ribbon fiber splices using 12-fiber ribbons. The medium sized closure shall accommodate up to 288 single fiber splices or 432 ribbon fiber splices. The large closure shall accommodate up to 480 single fiber splices or 864 ribbon fiber splices.

8.2.10 Spliced fibers shall not be subjected to a bend radius smaller than 30 mm (1.2 inches). Buffer tubes shall not be subjected to a bend radius smaller than 38 mm (1.5 inches).

8.2.11 The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by installation crews.

8.3. Performance Requirements

NOTE: The test procedures for evaluating these requirements are detailed in GR-771-

CORE, Issue 1, July 1994, Section 6.

8.3.1 A bond clamp shall remain firmly attached to the cable armor sheath while under a tensile load of 9-kg (20 lbf). Following removal of the load, there shall be no evidence of clamp loosening or damage to the cable sheath, armor, or clamp that would reduce its current carrying capacity as required by the AC fault test.

8.3.2 The electrically conductive path used for continuity and grounding of the splice closure metallic components shall be capable of withstanding an AC current of 1000 Amperes for 20 seconds.

8.3.3 The cable clamping and sealing hardware used to terminate optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 nm ± 20 nm.

8.3.4 An axial load of 100 lbf, individually applied to each cable, shall not cause mechanical damage to the cable or clamping hardware. The load to the optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 ± 20 nm.

8.3.5 Subjecting the closure/cable interface to 90° flexing for 8 cycles at ambient temperatures of –18 °C ± 2 °C (0 °F ± 3.6 °F) and 40 °C ± 2 °C (104 °F ± 3.6 °F) shall not cause any mechanical damage to the cable or clamping hardware. In addition, flexing of the optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 ± 20 nm.

8.3.6 Subjecting the closure/cable interface to 10 cycles of torsional loading at ambient temperatures of –18 °C ± 2 °C (0 °F ± 3.6 °F) and 40 °C ± 2 °C (104 °F ± 3.6 °F) shall not cause any mechanical damage to the cable or clamping hardware. In addition, torsional loading of the optical fiber cable shall not exceed allowable attenuation changes.

8.3.7 The closure shall not exhibit any mechanical damage after being subjected to a vertical drop from a height of 0.75 m (30 inches) at temperatures of –18 °C ± 2 °C (0 °F ± 3.6 °F) and 40 °C ± 2 °C (104 °F ± 3.6 °F).

8.3.8 The diameter of the optical fiber splice closure shall not permanently deform more than 10%, nor temporarily deform more than 20%, when it is compressed by a uniformly distributed load of 300 lbf. Additionally, the compressive load shall cause no mechanical damage to the closure or its contents.

8.3.9 The closure shall not exhibit any mechanical damage after being subjected to mechanical impact of 100 lbf (136 Nm) at temperatures of –18 °C ± 2 °C (0 °F ± 3.6 °F) and 40 °C ± 2 °C (104 °F ± 3.6 °F).

8.3.10 The closure central member clamp shall prevent movement (e.g. bowing, pistoning, or breaking) of the cable central member (CM) when the CM exerts a force of 100 lbf on the clamp.

8.3.11 Sealing components (gaskets, grommets, O-rings) used in a closure, shall not permit the entry of water into the closure after thermal aging at 90 °C ± 1 °C (194 °F ± 1.8 °F) for 720 hours (30 days).

8.3.12 The closure shall be capable of safe and proper assembly at temperatures of 0 °C ± 2 °C (32 °F ± 3.6 °F) and 40 °C ± 2 °C (104 °F ± 3.6 °F) using materials and procedures specified by the manufacturer.

8.3.13 The closure shall not exhibit any mechanical damage or corrosion following 30 days of severe temperature and humidity cycling from 65 °C ± 2 °C (150 °F ± 3.6°F) and 95% relative humidity to – 40 °C ± 2 °C (-40 °F ± 3.6 °F) and uncontrolled humidity. Additionally, at the midpoint of the temperature cycle, re-entry and re-assembly of the closure shall be done. If the closure has a hinged cover, it shall be flexed 25 times.

8.3.14 The closure shall show no evidence of water intrusion into the compartment containing fiber splices after it is immersed in water and subjected to 10 freeze/thaw cycles.

8.3.15 The splice closure shall show no evidence of water penetration following exposure to a 20-foot waterhead for a period of 7 days.

8.3.16 A closure shall show no evidence of corrosion following exposure to acidified saltwater for a period of 90 days.

8.3.17 The closure shall show no change in sealing ability after submersion in a specified chemical test fluid for 7 days. The mechanical integrity of the closure shall be confirmed by performing the compression and impact tests. The closure seal shall also be checked by performing the water immersion test. Additionally, samples of external, nonmetallic closure materials shall neither experience a change in weight greater than 10%, nor experience a reduction in tensile strength or elongation properties greater that 20%, after immersion in the chemical test fluid.

8.3.18 Samples of external, nonmetallic closure materials shall not have a reduction in tensile strength or elongation properties greater than 20% of their original value, after being exposed to a UV-B type ultraviolet light source with a peak emission at 313 nm for 2,160 hours (90 days).

8.3.19 Samples of polymeric closure materials shall not support fungus growth when tested per ASTM G 21. A rating of 0 is required.

9. CENTRAL OFFICE HARDWARE

9.1. The Fiber Distribution Frame shall consist of the following Corning Cable Systems part numbers:

ECL-BAY-7
ECL-IBU-7-1
UDF-IEC-7-75
ECL-J1U

The Fiber Distribution Frame shall meet the following requirements.

9.1.1 The optical fiber distribution frame shall meet all requirements stated in this specification.

9.1.1.1 The fiber distribution frame shall consist of a network bay frame with top and bottom jumper troughs.

9.1.1.2 The network bay frame shall have a 19-inch unequal flange frame configuration with 1.75-ince EIA hole spacing.

9.1.1.3 The network bay frame shall be 7 feet in height and accommodate 40 units of rack equipment.

9.1.2 The optical fiber distribution frame shall have optional storage units for vertical routing and management of jumpers.

9.1.3 The optical fiber distribution frame shall have optional storage units for horizontal routing and management of jumpers.

9.1.4 The optical fiber distribution frame shall have end caps to enclose the network bay lineup on each end.

9.2. The Pre-connectorized Stubbed Connector Housing shall be Coming Cable Systems part number ECLE45012A9-W7001B. The Pre-connectorized Stubbed Connector Housing shall meet the following requirements.

9.2.1 The optical fiber connector housing shall meet all requirements stated in this specification.

9.2.1.1 The optical fiber connector housing shall provide interconnect and cross-connect capabilities between outside plant cables and opto-electronics.

9.2.1.2 The optical fiber connector housing shall be capable of being rack-mounted in 19-inch or 23-inch equipment racks or fiber distribution frames.

9.2.1.3 The optical fiber connector housing shall be capable of housing 144 fiber optic adapters. The adapters shall be designed for use with LC UPC style optical fiber connectors.

9.2.1.4 The optical fiber connector housing shall occupy 4 standard EIA rack spaces of height.

9.2.1.5 The optical fiber connector housing shall incorporate a removable jumper waterfall that ensures the proper bend radius of jumpers exiting the

housing.

9.2.1.6 The optical fiber connector housing shall have an integral pre-connectorized cable stub which can be spliced to the outside plant cables of the optical fiber network. The cable stub shall be Riser (OFNR) rated.

9.3. Optical Splice Enclosure

9.3. The Optical Splice Enclosure shall consist of the following Corning Cable Systems part numbers:

OSE-HD0-WT-1
OSE-CBL-36
OSE-CBL-37
OSE-ST-1

The Optical Splice Enclosure shall meet the following requirements.

9.3.1.1 The optical fiber splice enclosure shall be designed to manage the transition between outside plant cables and flame-retardant indoor cables.

9.3.1.2 The optical fiber splice enclosure shall have an adjustable interior backplate and removable cable entry plates to accommodate top-only, bottom-only, and top and bottom cable entries.

9.3.1.3 The optical fiber splice enclosure shall be capable of housing 864 single-fiber splices from up to 42 cables.

9.17 Site Maintenance and Traffic Control

Contractor shall keep site free of debris and clutter at all times, and shall sweep traveled lanes daily or as directed by the Engineer. No stockpiling of excavated materials or spoils, nor storage of equipment or materials will be allowed on the adjacent properties.

Contractor may close one traffic lane during the active time of construction, but shall utilize flag persons at each end. Road shall be reopened, after daily cleanup, to two-way traffic at the end of work each day.